ABB SPA-Bus

ABB SPA-Bus communication protocol

Supported device types and versions

The protocol support data reading/writing from digital high-voltage circuit-breakers produced by ABB.

Communication line configuration

- Communication line category: Serial, SerialOverUDP Device Redundant.
- Transmission parameters are set to 9600 Baud, 7 data bits, even parity, 1 stop bit.

Communication line parameters

Communication line - configuration dialog - **Protocol parameters** tab.
The parameters influence some optional protocol parameters. The following protocol line parameters can be used:

Table 1

Parameter	Meaning	Unit / Size	Default value
Software 7E1	Parameter starts a software generation and even parity checking. A transmission device parameters can be set on 8N1 (i.e. 8 bits, no parity, 1 stop bit) instead of 7E1 (7 bits, even parity, 1 stop bit) which is commonly used in the SPA-Bus protocol.	YES /NO	NO
Moxa Redundancy Check Timeout	Switching time for redundant serial servers (e.g. Moxa N-Port devices) in case of a communication error. This parameter is only relevant for SerialOverUDP Device Redundant line.	sec	5 sec
Max. Data Number Optimization	Optimization data reading for polling. If there are I/O tags with *Data Number* successive addresses, the polling is executed together until the value of this parameter is reached (i.e. if the value is 3, three I/O tags will be polled together). Value 1 switches an optimization off, each I/O tag is polled separately.	1 .. 32	1
Time T Broadcast Periode	The period of sending a Time synchronization (T) packet by broadcast to address 900. When the parameter is 0 seconds., the time synchronization is disabled.	0 .. 60 sec	10 sec
Expected T Packet Transmission Duration	Expected duration of transfer of a time synchronization (T) packet by all the transmitting devices until the whole packet is received in the protection device itself. This time is added to a current time when the packet is being sent so that the time in the packet is a current time at the moment when the T packet is completely received by the device.	msec	20 msec
Date and Time D Broadcast Periode	Period of sending a Time and Date synchronization (D) packet by a broadcast to address 900. When the parameter is 0 seconds, the sending of synchronization is disabled.	0 .. 3600 sec	60 sec
Expected D Packet Transmission Duration	Expected duration of transfer of a Time and Date synchronization (D) packet by all the transmitting devices until the whole packet is received in the protection device itself. This time is added to a current time when the packet is being sent so that the time in the packet is a current time at the moment when the D packet is completely received by the device.	msec	35 msec

Station configuration

- Communication protocol: **ABB SPA-Bus**.
- The station address is a number in the range of 1 to 999, 0 is not used, 900 is reserved for broadcast.
- Time parameter settings - Polling parameters, are ignored, the polling of the values is executed in the shortest possible period.
- Time parameter - Synchronization time, is ignored, a real-time synchronization via the broadcast messages is controlled by the protocol line parameters "Time T Broadcast Period" and "Date and Time D Broadcast Period".

Station parameters

Communication station - **Protocol parameters** tab.
The parameters influence some optional protocol parameters. The following protocol line parameters can be used:

Table 2

Parameter	Meaning	Unit	Default value
Retry Count	A number of the request repetitions in case of a communication failure.	1 .. 20	2
Retry Timeout	The delay between a request retry in case of a communication failure.	msec	20 msec
Wait First Timeout	First waiting for a response after sending the request.	msec	50 msec
Wait Timeout	The delay between individual readings of the response until it is completed.	msec	20 msec
Max. Wait Retry	The maximum number of response readings until it is completed.	-	20
Recovery Delay	Communication with the station is delayed by defined time in case of a communication error. If a line contains more stations (protective devices) and one of them fails, it can slow down the communication to other functioning stations. Next recovery of the communication with a failed station will be delayed by a defined value (time). If the line contains only a single station, the parameter value should be 0 seconds.	sec	10 sec
Poll Events	This parameter activates a periodic event reading by the function "Last events L". Time synchronization of the protective device must be also enabled. See the communication line parameters "Time T Broadcast Periode" and "Date and Time D Broadcast Periode".	YES /NO	YES
Value For Invalid Position	An integer value of "ERROR" state for conversion to a quadrat input Qi.	0, 1, 2, 3	3
Value For Off /Open Position	An integer value of "OFF" state for conversion to a quadrat input Qi.	0, 1, 2, 3	1
Value For On /Close Position	An integer value of "ON" state for conversion to a quadrat input Qi.	0, 1, 2, 3	2
Value For Intermediate Position	An integer value of "TRANS" state for conversion to a quadrat input Qi.	0, 1, 2, 3	0
Date Conversion Mask	Conversion mask to convert date values.		yyyy-mm-dd
Time Conversion Mask	Conversion mask to convert time values.		hh.mi;ss.mss
Debug Values	This parameter activates a detailed debug info about I/O tag values obtained by polling.	YES /NO	NO

I/O tag configuration

Possible value types: **Ai**, **Ao**, **Ci**, **Co**, **Di**, **Dout**, **Qi**, **TxtI**, **TxtO**, **TiA**, **ToA**, **TiR**, **ToR**.

I/O tag address items:

- **Channel**: channel number is a required numerical address parameter intended for all data categories except for *F* and *C*.
- **Category**: data category code; if it is unknown, select "*Not defined*", if it is known, you can choose one of the following data categories:
  - *Input data I*
  - *Output data O*
  - *Setting Values S*
  - *Variable V*
  - *Memory data M*
  - *Slave identification F*
  - *Slave status C*

  "*Slave Identification F*" and "*Slave Status C*" categories don't require specifying of any other address parameter. The value is unique within the device.

  - "*Slave identification F*" returns 10 characters which identify a device. We recommend to configure it as I/O tag of TxtI type.
  - "*Slave status C*" returns a number 0, 1, 2 or 3. See also Note 1.
- **Data Number**: a mandatory numerical address parameter for all data categories except for *F* and *C*.
- **Poll**: enables periodic polling for all data categories except for "*Not defined*". The data category "*Slave identification F*" does not require periodic polling because it is static data. If the periodic polling is disabled, the object is polled only when the communication is started or when I/O tag value is unknown.

- **Event code - Intermediate position (00)**: a numerical address of event when the object goes to "Intermediate position". A value of "TRANS" can be set for Qi I/O tag type or a numerical value according to the protocol parameter "Value for intermediate position" for I/O tags of Ai, Ao, Ci, Co types. A configuration is not allowed for I/O tags of Di, Dout types.
- **Event code - Off/Open position**: a numerical address of event when the object goes to "Off/Open position". A value of "OFF" can be set for Qi I / tag type or a numerical value according to the protocol parameter "Value for Off/Open position" for Ai, Ao, Ci, Co I/O tags.
- **Event code - On/Close position**: a numerical address of event when the object goes to "On/Close position". A value of"ON" can be set for Qi I /O tag type or a numerical value according to the protocol parameter "Value for On/Close position" for Ai, Ao, Ci, Co I/O tags.
- **Event code - Invalid position (11)**: a numerical address of event when the object goes to "Invalid position". A value of"ERROR" can be set for Qi I/O tag type or a numerical value according to the protocol parameter "Value for invalid position" for Ai, Ao, Ci, Co I/O tags. The configuration is not allowed for Di, Dout I/O tags.

Note 1
When **E50** (slave reset) or **E51** (slave event buffer overflow) events occur, the value is written to the "*Slave status C*" category object with address 0, regardless of whether the I/O tag of C category exists or not.

Literature

- SPA-Bus Communication Protocol V2.5, Technical description, Version C, 1MRS 750076-MTD EN.

Changes and modifications

Document revision

- Ver. 1.0 - November 21st, 2010 - Document creation.

Related pages:

Communication protocols